LONG ISLAND Sinclair TIMEX GROUP

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9/84

L.I.S.T.ING

LIST
10 Idle Day Drive
Centerport, N.Y. 11721

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MEETING NOTES 8/26/84

I. Officers were elected and committee assignments made (by volunteers). They are:

a) President: Heinz Hanken
b) Sec'y Treas: Paul Donnelly
c) Library Staff:
1) Operation: Chuck R.
2) Documentation:
Games: Morton J.
Utilities: Rich B.
d) Mailing/membership data base: Bob M.
e) Newsletter: Paul D.

II. NEXT MEETING

Will be on Sunday, September 30th at 2PM. Location: 16 Cold Spring Hills Rd, Huntington, (11743). Call 516-692-7168 (Morty) or 261-6934 for directions.

III. NEW BUSINESS

a) News Items
1) 47th St. photo has raised the 2068 price to $120.00
2) Brooklyn Closeouts has them for $99.00
3) Aerco's 2068 Disk interface is still 6 weeks away.
4) Rich B. says Tom Woods has seen a copy of a 390 page TS 2068 ROM dissassembly.

b) Rumors.....
Still persist that Dave Higgenbottom will market Timex products under another name. We have no confirmation of this (see Syntax).

c) Newsletter Policy
The result of a series of voice votes has established our newsletter policy. Specifically;
1) Requests for information providing an SASE, will recieve 1 copy of the current newsletter, at once. Further requests will not be honored from the same individual.
2) Requests not providing a SASE will be held for reply by the corresponding secretary or another officer. While we are non-profit, we would also like to be "non-loss" and cannot afford extensive free mailing. It was decided however, that in the public interest, a copy of a newsletter(probably an excess and/or obsolete issue) would be sent to such inquiries.
3) The individual newsletter price to non-members will be $1.00, plus postage
4) Requests from bona fide user groups will be honored as long as newsletter exchange continues (we currently correspond with 4 groups).
5) Members who join during the current club year, will pay full dues: $12.00, and receive all back issues to the beginning of the club year (February to January). A member joining in September 84, then, would receive seven back issues as well as issues for September '84 through January '85.
6) Advertising It was decided that LISTing will accept paid advertising if asked. We will not solicit ads. Any finds obtained in this way will be kept separate from the general fund and their use will be voted upon separately.

7) September Issue This issue will be a double issue, by popular demand. Treasury funds should be sufficient to cover this one extra issue.

d) Library Tape
a) A Round Robin scheme for access to the library tape by out-of-state members was proposed and is in the trial phase. Mailing costs will be the major problem. It costs about $1.00 to mail the tapes one-way - this money must somehow be recovered. Non-attending members must currently mail in their cassette* & $1.50 to cover postage and handling in order to obtain the Library tape.
b) Documentation for the library tape is non-existant. While many of the programs have been provided in previous issues of LISTing, some explanation should accompany the tape. Rich B. and Morty will work on documentation package.
c) Duplication - Chuck R. will make several copies of the Library Tapes prior to the next meeting. The group has purchased blank tapes and these will be used and then exchanged with members at the next meeting. Bring a blank tape if you wish a copy.
e) Demonstration
1) Paul D. demoed his "Spectrum" (a 2068 with a Spectrum ROM installed) and Doug Dewey's Emulator. Both allow use of Spectrum Software (both BASIC and MC). So far, all packages tried have run. We suspect that there can be incompatibility and so will continue to test programs (see listing inside for what works, so far).
2) Bob G. brought in his Hartanex RGB Monitor. Bob used a very simple adapter to get the RGB and composite signals to the monitor. Colors and resolution (8MZ) were astounding. Bob showed us some other slick hardware projects he's developed for the 1000 and 2068 and these will be documented in upcoming issues.
f) Jeff S. demoed his "Ultimate Word" 64 column word processor, currently under first development. An outstanding example of the TS 2068's capabilities, it produces true 64 column text on the screen, but can also display in several 32 column modes for ease of use on TV's.
g) Nazir P. showed us the final draft of his ROM cross-reference directory. He has cross-referenced all the major entry points for the TS and Spectrum ROM! His articles should start appearing in Syntax soon, as well as being serialized in LISTing.
h) Requests for Beginners / BASIC classes were made. No one volunteered to teach, at the meeting, but several members approached me afterwards to say they'd like to try. Let's have some volunteers and work out a syllabus next time!
i) A letter was written to Herma in Germany looking for pressure sensitive thermal labels.

*Containing a program or two, we hope!

P1

ELEMENTARY PIANO

Copyright N.A. Pashtoon ,1984

The GI 8912 integrated circuit , a powerful sound making chip , is utilized in the TS2068 in conjunction with the SOUND command . The GI chip can provide 3 channels of sound as well as three noise channels simultaneously .The pitch , envelope, attack and decay time , and duration of the waveform can all be brought under program control . It is worth mentioning that even though the chip is capable of a plethora of sounds it does not have the versatility of say the Commodore sound-making chip used in the Commodore 64 , which provides for program controlled filtering of the sound channels . Thus the TS2068 cannot be used as a true sound synthesizer .

In the program that follows, an attempt is made to create a piano-like sound with a 3 octave range . The TS2068 is capable of generating polyphonic sound , but in this program only Channel A of the sound generator is utilized . I am hoping to develop a more versatile program in the future .

PROGRAM NOTES :

Lines 10-300: The white and black keys of the piano are plotted on the screen . Each piano key is identified with the QWERTY keys on the keyboard.

LINE 610 :The string variable k$ is identified as the string of keys which will be used for the piano keyboard .

LINE 600,and 620-640:The dimensioned variable b() is used to redefine the "character set ". The character set in this case is none but the pitch values given on p.187 of TS2068 Manual. These pitch tables for the various octaves are given in the DATA statements in LINES 1000-1400 .

LINE 760 , 900-980 : activates the lower octave .

LINE 765,800-880 : activates the middle and upper octave .

Finally the variables F and z are flags to differentiate between octaves .

*See screen dump p.11

```
   1 REM "ELEM-PIANO"  , 3 octaves
  10 FOR x=3 TO 252
  20 PLOT x,10: PLOT x,100: NEXT x
  30 FOR x=3 TO 260 STEP 25
  40 FOR y=10 TO 100
  50 PLOT x,y
  60 NEXT y: NEXT x
  65 LET n=0
  70 FOR x=28 TO 228 STEP 25
  80 LET n=n+1
  90 IF n=3 OR n=7 THEN GO TO 130
 100 FOR y=40 TO 100 STEP 1
 105 FOR e=1 TO 12
 110 PLOT x-6+e,y
 115 NEXT e
 120 NEXT y
 130 NEXT x
 140 FOR x=0 TO 9
 150 LET k$="QWERTYUIOP"
 160 PRINT AT 19,x*3+2;k$(x+1)
 170 NEXT x
 190 LET k$="2356790"
 200 PRINT AT 14,3; BRIGHT 1; INVERSE 1;k$(1);AT 14,6;k$(2);AT 14,13;k$(3);AT 14,16;k$(4);AT 14,19;k$(5);AT 14,25;k$(6);AT 14,28;k$(7): INVERSE 0: BRIGHT 0
 300 PRINT AT 3,1;"For lower octave press";AT 3,27; BRIGHT 1;"A"; BRIGHT 0;AT 5,1;"For middle octave press"; BRIGHT 1;AT 5,28;"S"; BRIGHT 0;AT 7,1;"For higher octave press"; BRIGHT 1;AT 7,29;"D"; BRIGHT 0
 500 REM   MUSIC  MAKER
 510 RESTORE 1200
 520 LET F=0
 600 DIM b(256)
 610 LET k$="q2w3er5t6y7ui9o0p"
 620 FOR l=1 TO 17
 630 READ b(CODE k$(l)+1)
 640 NEXT l
 650 LET k=CODE INKEY$+1
 660 IF INKEY$="a" OR INKEY$="A" THEN RESTORE 1000: LET F=1: GO TO 620
 670 IF INKEY$="s" OR INKEY$="S" THEN RESTORE 1200: LET F=0: GO TO 620
 680 IF INKEY$="d" OR INKEY$="D" THEN RESTORE 1400: LET F=0: GO TO 620
 760 IF b(k) AND F=1 THEN GO TO 900
 765 IF b(k) THEN GO TO 800
 770 GO TO 650
 800 REM
 850 SOUND 0,b(k);1,0;8,31;11,16;12,55;13,8;7,56
 860 PAUSE 120
 870 SOUND 8,0;7,63
 880 GO TO 650
 900 LET z=0
 910 IF b(k)<164 THEN LET z=1
 950 SOUND 0,b(k);1,z;8,31;11,16;12,55;13,8;7,56
 960 PAUSE 120
 970 SOUND 8,0;7,63
 980 GO TO 650
1000 DATA 162,138,116,95,75,57,39,23,7,248,234,221,209,197,186,175,165
1200 DATA 209,197,186,175,165,156,147,139,131,124,117,110,104,98,93,87,82
1400 DATA 104,98,93,87,82,78,73,69,65,62,58,55,52,49,46,43,41
```

L_I_S_T GROUP

Word - 2068

This article is being written on "Word", a simple word processing program from C. Choo. BASIC, yet still has reasonable typing speed. Editing facilities are bare bones, but appear adequate for the generation of letters, notes, and short articles like this one.

The command structure of "Word" is spartan, and consists of the following

```
ded:   creates a file
list:  prints it
edit:  allows editing
save:  saves to tape
load:  loads a tape
look:  looks at the file
```

There is no provision for such desireable features as block moves, deletes or inserts(which I need right now to complete the list of commands (with d: instructions)). Also missing are search capabilities, i.e. looking for a particular string in the text, and the ability to format the output to the printer

You are limited to the 32 column width of the TV and 2040 Also, there is no end-of-line warning, to tell you when you'll need to hyphenate a word. This means you must constantly be watching the screen to see where you are in a word. Touch typists may be able to live with the somewhat slow (BASIC) response of the keyboard, but would find this last a real bother.

Now, with all the "bad" features of "Word" out of the way, lets look at its good side. No. 1, "Word" is very inexpensive-a kind word, a blank cassette, and a few dollars to cover expenses will probably get you a copy. "Word"'s editing facilities are just like BASIC, including the ability to use the cursor keys, and DELETE(though you can't change the total length of a line). This means you probably can operate "Word" right away, and don't need to learn a whole new word processing language. And third, and perhaps most important, the BASIC is robust as well as user programmable. I made some serious mistakes about two paragraphs above , but was able to recover from them easily, from BASIC, and without loss of text.

Despite its limitations, "Word" may be all you need if your text is simple, your needs infrequent, and your budget tight. There was no documentation with my review copy, so I don't know how much text you can enter. This article is on its fifth "page" or screen, now, and there seems to be lots of memory left. In fact, I'll exit to BASIC right now, and see what FREE returns...

I get FREE=23031, not bad. Note line 0035 in the program DIMS the text at 5120, though you could probably change that if you like.** "Word", and in particular it's ease of use and cursor editing, are impressive achievements in BASIC programming.

P. Donnelly
10 Idle DAY
Centerport,
NY 11721

*You can find a listing of Word in the May '84 issue of P.C. WORLD magazine.

**That's eight pages to start.

Of course, you can't edit the string w/o "Word", but it's a quick way to retrieve the text.

Who, out there, can use the 2068 $TRING routines to do searches?!

```
 10 REM GO TO 100
 35 DIM T$(5120)
 40 LOAD "" DATA T$()
100 PRINT T$
200 STOP
300 LPRINT "
    P.S.  This short program is
          all you need to re-
          enter you string for
          printing.  You need
          LOAD only the text
          string T$ and LPRINT
          it."
400 PRINT "Don't forget to
           skip line 35 after
           the first run."
```

SOFTWARE REVIEW

PROGRAM: CITY OF XON
TYPE: ARCADE
ROM/RAM: 8K/16K
WRITTEN IN: MC
LISTABLE: YES
FROM: PLEASANTREES PROGRAMMING
7760 N. HOPDOWN AVENUE
TUCSON, AZ 85741
PRICE: $17.95 (check)

If you're looking for an outstanding display of 3D Hi-Res graphics, then XON, Pleasantrees version of ZAXXON, should be a treat for you. On the other hand, as an exiting arcade game, XON would have trouble competing with "PONG".

Plesantrees Programming wrote a book on graphics (A to Z) which does a creditable job and the XON program illustrates 3D scrolling graphics discussed in the book as only Machine Code programs can do it.

After a brief BASIC randomize routine, you are presented instantly, at finger touch, with a rules screen. This tells you that the keys A,S,D,F,G control such functions as shields, disruptors, phasors and a grappling hook. The arrow keys control your motion up, down, left and right. Two more button pushes and the game is under way.

Your game screen consists of fuel, elapsed time, points and status message windows at the edges of the screen and the action scenario in the center. An excellent representation of Xonian landscape passes from upper right to lower left of your screen, simulating 3-D motion along a virtual "Z" axis. Your ship, and its "shadow" on the ground, starts at the far left side of the screen and you control its movement up, down and "in" and "out" of the screen in small increments as the landscape speeds below. Your goal is to destroy as much Xonian real estate as possible, without getting destroyed yourself and to eventually (it takes as much as 30 minutes) grapple for Xon himself.

The scrolling landscape is a fine graphics job. You are warned on your sensor screen which obstacle will be coming up next e.g., "Nearing Castle Keep" and shortly thereafter the object scrolls onto the screen from the right. There are at least 10 physical obstacles (including; Photon Batteries, Missile Silos, Robot factories, etc.) and some non-physical ones (intense radiation fields). Flying over this landscape is interesting for a while, but you soon learn that not only do the laws of physics apply loosely on XON, the laws of arcadia apply hardly at all.

We've discovered that your phasors do just as much damage as your more power hungry (by a factor of 3) disruptors. Also, while some of Xonian artillery shoots back, none of it can hit you. By a similar token, you need not "hit" a target (which doesn't blow up anyway), but must simply press the fire button to accumulate points. Grappling for fuel tanks has only worked once, we think, in hours of play; and grappling for Xon is impossible. This is the most frustrating part of the game as you must play for 2 Xonian hours with only one ship, (between 20 and 30 minutes) before you can meet Xon. Once you approach Xon's lair you get only one chance to grab him. In fact, we couldn't even figure out which object was Xon.

Documentation is poor, consisting of one reduced size typed page, and the anti-record tabs were not broken off my copy. If you have or order "Xon", be sure to break these off as soon as you get it (and any commercial software) to prevent accidental erasure.

On the good side, Pleasantrees has provided pokeable memory locations, values and USR calls which let you change the high score level, see the "Victory" accolade (perhaps the only way you ever will) and practice the grappling sequence. And of course, the graphics, as graphics, are first class. Pleasantrees has also supplied a number of very nice consolation prizes to patient waiters, including for example, a copy of a "Boggle" type game on the back of the Xon tape.

The bottom line however, is that even after waiting about 11 months, I have not recieved a "finished" copy of Xon. While Xon gets a 10 for graphics I can only give it a 2 for arcade play and on overall rating of 5. If the game did all it should be able to do, it would deserve a score in the 9.5 range.

P.J. Donnelly
@ copyright 1984

City of Xon

Story

Evil Ion and his forces are positioned on a ridgetop encircling the great valley of his peasants. Your mission is to smash out as many Ion and bring him to justice. If you endure and finally meet Ion face to face in battle you will have but one run at capturing him with your grappling hook. Only successful capture will allow you the winner's accolade.

Remember that your energy is precious: use weaponry, armor, and the grappling hook judiciously. On board sensors will tell you of what lies directly ahead. Your crew will help with repairs as needed. The best of luck to you and your ship.

Playing

The only real way to meet Ion is to gain a score of over 300,000 and to stay in the air successfully for at least 2:00:00 Xonian hours. To proceed that far takes skill indeed. We find that using the right hand for the arrow keys and the left for keys A,S,D,F,G is the simplest to get used to. You will naturally become better at time goes on. A joystick could be used but generally takes two hands. Unless you want someone else to run the other controls it is really impractical.

The strategy in a nutshell: to catch your energy level, stop from being hit, and keep from flying into structures. Good luck!

Technical

We have written a few programs in our time, even a book, but no program was as ambitious as "City of Xon". We tried to crowd every sprite and pixe your ink tight top to bottom. It took us nearly 1000 man-hours to write. We hope that you enjoy this one!

To enhance your enjoyment the following are provided as options:

1. To see the accolade: (now this is cheating!)
   RUN the program, then hit "G" in the rules screen.
   Now try RAND USR 17344

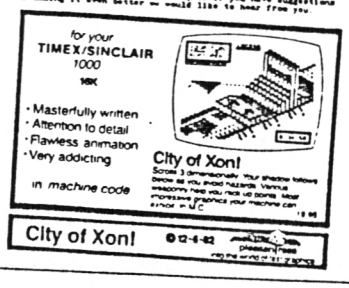
2. To change the score (300000) and time (2:00:00) limits:
   Use: addresses 26242 (score) and 26232 (time).

For limit of:	POKE this number into address:
0	28
1	29
2	30
3	31
4	32
5	33

   Note: setting both limits to 0 might cause system to crash.

3. To see entire Ion attack sequence:
   RUN the program and hit "G" in rule screen (as in #1.)
   Now try RAND USR 29184

P.S.-- If you like this game we rated up or if you have suggestions for making it even better we would like to hear from you.



Useful peeks and pokes

You might like to pass these useful tips on to other members:

10 PRINT (((PEEK 23732 + 256*PEEK 23733) + 1)/1024)-16 prints the memory size of your Spectrum.

LET t = 7997 - USR 7997 gives a reaction time in fiftieths of a second, i.e. the time it took you to press a key. PRINT t gives the result.

LET a = USR 1278 provides a loading pattern; you can use the following numbers - 1248, 1276, 1301, 1488, 1314 etc.

Vince Kelly
(Bootle, Lancs)

THE CHANGELING

CONVERTING YOUR 2068 TO A SPECTRUM

Doug Dewey's EMU-1 is a convenient and effective way to achieve Spectrum emulation on your TS 2068. It has the distinct advantage of not requiring you to open up your machine and go mucking about inside. There are however, two other ways to provide Spectrum capabilities on your 2068.

The first, and least expensive, method is to replace your Timex ROM with a Spectrum ROM. These cost under $20.00 (see my ad) and installation is as follows:

1. Disconnect your computer from everything and clear a work space for your labors. Remember to ground yourself well to prevent static electricity from damaging your machine.

2. Turn your 2068 belly-up and loosen the seven Philips head screws (3 large and 4 small).

3. Carefully, holding the sides of the case together, turn the machine back upright. The screws will fall out, if you haven't removed them, so make sure they don't get lost.

4. Place the machine on the table and slowly lift the top cover from the front. There is only one connection between the top (Keyboard) and bottom (circuit board) and that is the keyboard's flat cable. This cable is more durable than the ZX81 version, but is still easily damaged. You can now either prop up the top of the case, or better yet, carefully and slowly pull the flat cable out of its socket. Try to pull it out evenly by grasping it at either side using both hands (while the backs of your hands hold up the top case.

5. With the top removed, look for U16, the 16K ROM. We can ignore the other 8K chip (U20) as it is simply not used by the Spectrum. Using a IC extractor, remove U16. If you don't have an IC extractor, a screwdriver with a large flat, but thin blade and thin shank can be used. Place the tip of the driver between one end of the chip and its socket and twist slightly. When one end of the chip starts to move, go to the other end and repeat the operation. Keep doing this, a little at a time, until the chip is out. Place the chip in the back of the plastic foam pad in which your new Spectrum ROM is still sitting. (This is antistatic foam).

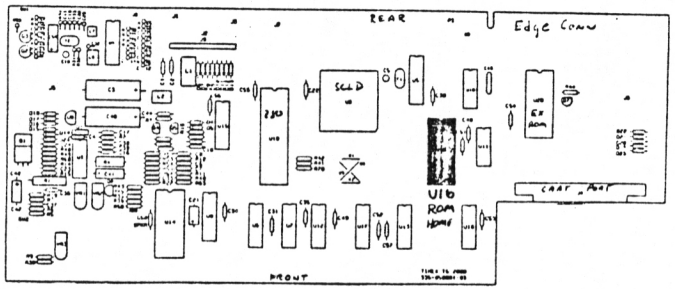
6. Make sure the pins on your new ROM are straight and then insert the chip, starting with one row and then the other into the socket. If the pins seem too wide apart, place the chip on its side on the table and gently roll it into the pins on one side, this should close up the gap, on all pins, slightly. Make sure you put pin 1 of the ROM where it belongs. Pin 1 is in the upper left hand corner of the chip. It is usually marked with a dot. Also the top of the chip will probably have a notch, as shown in the outline on the drawing.

7. Seat the ROM fully and then reassemble the case by reversing the above procedure.

8. Turn on your Spectrum and have fun!

Another hardware method is shown in SUM (Sinclair/Timex Users Magazine), August '84 issue. (SUM is at 3224 N.W. 30th Avenue, Gainesville, Fla. 32605). In the article, a description of a simple "double" ROM board and switch is provided. You mount both Timex and Spectrum ROMS on the board along with a few resistors and an external switch. Construction plans for the board were not included in my copy of the magazine, so you'll have to write to them for that. However the job is straight-forward and consists of mounting the two chips on a small p.c. board. A hole has to be drilled in the back of the case for your select switch, but otherwise, given that you've already assembled the board, installation is the same as for the Spectrum ROM alone (given above). The big advantage of this system is, of course, the fact that the choice of ROM is switch selectable. Cost of the board is unknown, but a kit of that size normally sells for about $20.00 with all parts, but the ROM, (another $20.00).

Both systems, when configured as Spectrums, should work the same. I used the first method and have used my "Spectrum" on all the software listed in the table. Much of the U.S. software (which was converted U.K. stuff in the first place) will run on the "Spectrum" with little or no modification. In fact, I now use "Spectrum" almost exclusively, as BASIC programs I write for it all seem to work on the 2068 anyway.

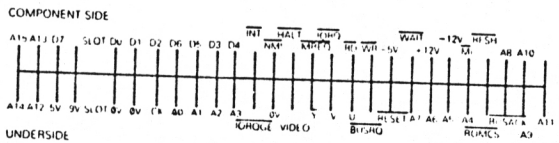


TS2068 PC BOARD COMPONENT LAYOUT

One last possibility, John Oliger sells 2068 cartridge read boards (meant to be AROS (Application ROM oriented Software) and thus mapped normally above 32K. However, his boards are remappable and it should be possible to use them, if not with Spectrum ROM then with a home-made EPROM, like Dewey's. Note the code differences between the 3 chips on the bottom of the page and compare this to what the TS 2068 technical manual says is needed for a LROS.

NOTE: THESE ARE DIFFERENT FROM THE TS 2068

The control, data and address busses are all exposed at the back of the Spectrum, so you can do almost anything with a Spectrum that you can with a Z80. Sometimes, though, the Spectrum hardware might get in the way. Here is a diagram of the exposed connections at the back.



WE HAVE SPECTRUM ROM'S

AVAILABLE TO LIST MEMBERS $18.00, NON-MEMBERS $19.95. PRICE INCLUDES POSTAGE AND PACKING. MAIL CHECK, MO TO

LIST ASSOCIATES
10 IDLE DAY DRIVE
CENTERPORT, N.Y. 11721

SOFTWARE TESTING - SPECTRUM EMULATOR EMU-1

FOR TIMEX 2068

TITLE	VENDOR	TYPE	COMMENTS	RATING
Fantasia	Rabbit Software	Arcade	Galaxian type very difficult without joystick - all M.C.	5
Everest Ascent	Richard Shephard	Strategy Adventure	All BASIC Select best options	6
Bridge	P.C. Associates	Card Game	Play the Computer or set hands	7
Flight Simulator	PSION	Simulation	Virtually identical to Timex. Crash is Different	8
Maze Death Race	PSS	Arcade	MC & BASIC Maze Game	6

SOFTWARE TESTING - SPECTRUM ROM

IN TIMEX 2068

TITLE	VENDOR	TYPE	COMMENTS	RATING
Kong	Ocean Software	Arcade	4 screens fair to good graphics. Poor attr updates	7 (-)
Halls of the Things	Crystal Computing	Arcade/ Adventure	Fast, Complicated Difficult and with good graphics	9

Also The Software Listed (tested on EMU-1) above is OK.

LATE NEWS FLASH!

1. Doug Dewey tells us that new, 5 page documentation, including 150 U.K. Titles which work on the emulator (and a few that don't), is due out by the time you receive this.

2. G. Russell electronics (of Winky board fame) is rumored to have a "ROM switch" set-up available for sale.

3. Brooklyn Closeouts, 167 Klymer St. Brooklyn, N.Y. has:

TS 20068's	-	$99.95
Printers	-	$40.00
Recorders	-	$30.00
Software 1000	-	$ 8.00
2068	-	$10.00
Paper	-	3/$ 3.50

LET'S LOOK AT THE ROM'S

U.S. SOFTWARE ON THE "SPECTRUM"

We tired some of our U.S. "generated" software on a TS 2068 with emulator and got some very interesting results:

1. Flight Simulator, like its British counterpart, works on either machine.

2. VU-Calc and VU-3D work.

3. BASIC PROGRAMS (e.g. Transylvanian Tower and Everest Ascent - converted for 2068) work OK as long as they're not too long (3000 bytes less available memory).

4. Penetrator, not only runs, but the joystick works! This means the author is directly addressing the ports.

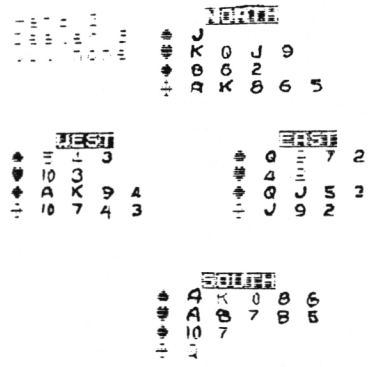
5. Dragmaster bogs down on ONERR, sound and stick commands. These are easy to spot (look for [or I) or simply Run and check the offending line out), and the rewrite author has thoughtfully left the original Spectrum lines in as REM's. Turn the tables (i.e., REM out those Sound commands), and your're in business.

6. Smugglers Cove (Quicksilva) works just fine.

7. Keyboard Tutor, Logo, work if you make the corrections listed in 5 above. The ONERR statements are the real culprits.

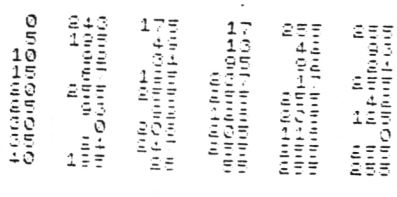
8. Zews Assembler (2068 version) Loads, but won't work.

Here's a typical Hand from Wheen's "Bridge Player" (after it's been played). While available only for the Spectrum, we've corrected it to run on the TS2068. The first problem here (as it is all in BASIC) is the copyright protection scheme, which is M.C. loaded up near RAMTOP and must be removed. With that out of the way, you must still remove a number of lines from the program (e.g., the copyright jump lines and some of the more verbose instruction screens) in order for it to fit in a 2068. Remember BASIC programs typically load about 2955 bytes higher on a 2068 than on a Spectrum. Therefore, a really full program, like this one, needs to be "trimmed" to fit in the tighter space. We'll have a review of Bridge Player in an upcoming issue.



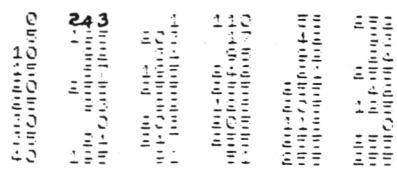
TIMEX 2068

LOC CONTENTS



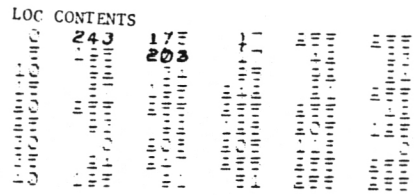
EMULATOR EMU-1

LOC CONTENTS



SPECTRUM

LOC CONTENTS



HARDWARE REVIEW

ITEM: EMU-1 SPECTRUM EMULATOR
FROM: DOUG DEWEY (ENTER LENGUA)
206 JAMES STREET
CARRBORO, N.C. 27510
FUNCTION: CONVERTS YOUR 2068 INTO A SPECTRUM
PRICE: $60.00 (INCLUDES P&P)

Doug Dewey's EMU-1 is a small (2" X 3"), open, double sided, p.c. board which plugs into the cartridge port of your 2068. It contains a 74LS155 for chip select and a 27128 EPROM, programmed to look like an LROS (Language ROM Oriented Software) package to the 2068. Once recognized by the system, LROS's take over control, and this one is programmed to act just like a Spectrum ROM.

I received my EMU-1 about 1 week ago and taking it out of its foil wrapped box with trembling fingers, inserted it into my 2068's cartridge port. It's a fairly snug fit, and close attention to the attached instruction sheet helps make the operation go smoothly. In addition to the insertion/removal instructions, Mr Dewey provides a 4 page letter describing the background and use of the board, some encouragements and warnings to prospective users.

Once you power up, the 2068 initializes itself and then checks the first few bytes of whatever is in the cartridge port. In this case, it finds there is another "language" you want to use and transfers control to that chip. (You could be running FORTH, for example). What you'll see on the screen at switch on is the familiar double copyright notice. Immediately however, as control is transferred to your "Spectrum" Eprom, the system reinitializes and only the @ 1982 Sinclair Research notice remains. When that happens, you've got yourself a Spectrum.

The board works well with all the Spectrum Software we could dig up (see lists), and since U.K. software sells for about 1/2 of its U.S. equivalent, a whole new world of computer power is available to you. We've even ordered PASCAL, the Hobbit and Jet Set Willy, based on the performance of the board.

There are some minor drawbacks to the board of which you should be aware. First, is the fact that its an open board. While this is somewhat objectionable from a cosmetic standpoint, more important is the possibility that you could damage the chips in handling. Take normal precautions to prevent static electricity buildup. Second, the edge connector is not gold plated. This means it can only take a limited (though still perhaps in the hundreds) number of insertions and removals before needing to be re-tinned. Again, you can correct this yourself, by having the edges gold plated. These are, as we said, minor complaints, and should prove to be of little importance to most users.

Finally, you should also be able to LOAD and run your existing library of BASIC programs with very little difficulty. The only commands that cause a problem for the interpreter are ON ERR, STICK, SOUND, and FREE. Peaks, Poke and USR's will work, but perhaps not as you expected, so check these also.

The EMU-1 is perhaps the most powerful add-on you can get for your 2068. With it, you'll have access to a tremendous installed base of UK software and still be able to use your 2068's extra capabilities and U.S. software. I rate the EMU a 9.7 out of 10.

@1984 P.Donnelly

CATALOGS RECIEVED

Integrated Data Systems 11 Brighton Avenue Toronto, Canada M4M 1P3 (416) 466 5571	Exceptionally CompleteCatalogs for the ZX/TS & 2068 - The ZX/TS is 34 pages of full size type with descriptions.
John Oliger 11601 Whidbey Drive Cumberland, In. 46229	For the dedicated hardware enthusiast. Memory, Eprom (read & program) boards and connectors - Bare Boards and parts kits available (see SQ back issues).
BCD Electro PO Box 830119 Richardson, Tx 75083-0119	Disk Drives, Disks power supplies Disks at 1.00 each Drives @169.00ea
D. Lipinski Software 2737 Susquehana Road Roslyn, Pa. 19001	BASIC only home & business TS 1000 & 2068
E. Arthur Brown 3404 Pawnee Drive Alexandria, MN, 56308	Hardware & Software All at or near full list price. Claims availability of Snart II software.
Knighted Computers 707 Highland Street Fulton, N.Y. 13069	Most hardware & software Somewhat below list prices
P.V. Tubes 104 Abbey Street Accrington BBSIEE Lancs	Software (Spectrum) and hardware replacement parts for ZX81 & Spectrum
Melbourne House Castle Yard House Castle Yard, Richmond TW106TF	Books & Software for Spectrum (e.g., ROM disassembly
Software Supermarket 87 Howards Lane London, England SW156NU	All Spectrum & ZX81 titles

POLICY ON CONTRIBUTED MATERIAL:

We are always looking for interesting articles, programs, reviews etc. to help keep our members informed and entertained. Articles submitted for publication are printed on the following basis:

1. You, the writer, maintain the full copyright and can resell, lend or give away your work, as you wish.

2. We are granted the right to publish your material, in the original issue in which it appears. Reprints (e.g., to supply orders for back issues) will include your material as a part of its original issue. We are not allowed to sell your material in any other way, without your express written consent;

   We can't (for now) pay you for your material, but you will recieve a copy of the issue in which it is published, even if you're not a member. You may get more than one issue and you will definitely earn the respect and appreciation by your greatful peers.

   If you have a program or article about something you've tried, please send it in. Our group interests are so varied that I can almost certainly guarantee that someone else can use your expertise to solve his problem.

```
1000 PRINT TAB 10;"PRECESSION"
1010 PRINT TAB 3;"BY J.P. POOL AND R.L. BERRY"
1015 PRINT
1020 PRINT TAB 9;"ASTRONOMY 8/84"
1022 PRINT
1024 PRINT TAB 4;"TRANSLATED TO TIMEX SINCLAIRBY BOB HOWARD, WA6DLI"
1025 PRINT
1030 PRINT "THIS PROGRAM CONVERTS RA AND DEC  COORDINATES FROM ANY EPOCH TO ANY
YEAR."
1035 PRINT
1036 PAUSE 300
1037 CLS
1040 LET R=.01745329
1050 PRINT
1060 REM COMPUTE CONSTANTS OF PRESC.
1070 PRINT "ENTER INITIAL EPOCH:(E.G.1950) ",
1075 INPUT IN
1080 PRINT IN
1090 PRINT "ENTER FINAL EPOCH (4 DIGITS) : ",
1100 INPUT FI
1105 PRINT FI
1160 LET T1=FI-IN
1170 LET T=T1/100
1180 LET Z0 ((2305.65*T)+(.302*T*T)+(.018*T*T*T))
1190 LET Z1=R*(Z0/3600)
1200 LET Z=(Z0+(.79*T*T))/3600
1210 LET TH=R*((2003.829*T)-(.426*T*T)-(.042*T*T*T))/3600)
1220 PRINT
1230 REM INPUT COORD AND MOTION
1240 PRINT "INITIAL RA:    HH MM S.F",.
1245 INPUT RS
1250 PRINT RS
1255 PRINT
1265 PRINT "INITIAL DEC?:   +DD MM SS",.
1266 INPUT DS
1267 IF DS(1)="+" OR DS(1)="-" THEN GOTO 1270
1268 IF DS(1)<>"+" OR DS(1)<>"-" THEN PRINT "PLEASE USE SIGN AND RE-ENTER"
1269 IF DS(1)<>"+" OR DS(1)<>"-" THEN GOTO 1265
1270 PRINT DS
1275 PRINT
1278 PAUSE 200
1279 CLS
1280 PRINT "PROPER MOTION:(MURA,MUDC)","TWO ENTRIES (E.G,-.02,.213)".
1282 PRINT "(ENTER""00""IF UNKNOWN)",
1285 INPUT MURA
1287 CLS
1290 PRINT "MURA: ";MURA,
1295 INPUT MUDC
1300 PRINT "MUDC: ";MUDC
1305 PRINT
1310 LET MURA=T1*15*MURA/3600
1315 LET MUDC=T1*MUDC/3600
1320 LET IRA=VAL (RS( TO 2))
1325 LET IRA=IRA+VAL (RS(4 TO 5))/60
1330 LET IRA=IRA+VAL (RS(7 TO ))/3600
1340 LET IRA=15*IRA
1345 LET IDC=VAL (DS(2 TO 3))
1350 LET IDC=IDC+VAL (DS(5 TO 6))/60
1355 LET IDC=IDC+VAL (DS(8 TO ))/3600
1370 IF DS(1)="-" THEN LET IDC=-IDC
1390 LET ALO=R*(IRA-MURA)
1400 LET DLO=R*(IDC-MUDC)
1410 PRINT
1420 REM PRECESS COORD.
1430 PRINT
1440 LET A=COS (DLO)*SIN (ALO+Z1)
1450 LET B=(COS (TH)*COS (DLO)*COS (ALO+Z1))-(SIN (TH)*SIN (DLO))
1460 LET C=(SIN (TH)*COS (DLO)*COS (ALO+Z1))+(COS (TH)*SIN (DLO))
1470 LET ALPMZ=ATN (A/B)/R
1480 LET AL=(ALPMZ+Z)/15
1490 IF B<0 AND A>0 THEN LET AL=AL+12
1500 IF B<0 AND A<0 THEN LET AL=AL+12
1510 IF B>0 AND A<0 THEN LET AL=AL+24
1520 LET DL=ATN (C/SQR (1-(C*C)))/R
1530 PRINT
1535 REM DEC RA  TO HH MM SS.F
1540 PRINT
1550 IF AL =0 THEN LET RAH=INT (AL)
1560 IF AL<0 THEN LET RAH=INT (AL)+1
1570 LET RAM=INT (60*(AL-RAH))
1580 LET RAS=INT (3600*(AL-RAH-(RAM/60)))
1590 LET RAF=INT (36000*(AL-RAH-(RAM/60)-(RAS/3600)))
1600 LET HS=STR$ (RAH)
1605 LET MS=STR$ (RAM)
1610 LET SS=STR$ (RAS)
1615 LET FS=STR$ (RAF)
1620 IF RAH 10 THEN LET HS(1)="0"
1625 IF LEN HS=1 THEN LET HS="00"
1630 IF LEN HS=3 THEN LET HS=HS(2 TO 3)
1640 IF RAM 10 THEN LET MS(1)="0"
1650 IF LEN MS=2 THEN LET MS=" "+MS
1660 IF RAS 10 THEN LET SS(1)="0"
1670 IF LEN SS=2 THEN LET SS=" "+SS
1675 LET FS="."+FS
1680 LET AS=HS+MS+SS+FS
1700 REM DEC TO DD MM SS
1705 PRINT
1710 IF DL<0 THEN LET GS="-"
1715 IF DL>=0 THEN LET GS="+"
1718 IF DL<0 THEN LET DD=INT (DL)+1
1720 IF DL>=0 THEN LET DD=INT (DL)
1730 LET DL=ABS DL
1732 LET DD=ABS DD
1735 LET DM=INT (60*(DL-DD))
1740 LET DS=INT (3600*(DL-DD-(DM/60)))
1750 LET ES=STR$ (DD)
1752 LET NS=STR$ (DM)
1760 LET TS=STR$ (DS)
1770 IF DD 10 THEN LET ES(1)="0"
1780 IF LEN ES=3 THEN LET ES=ES(2 TO 3)
1790 IF DM 10 THEN LET NS(1)="0"
1800 IF LEN NS=2 THEN LET NS=" "+NS
1810 IF DS 10 THEN LET TS(1)="0"
1820 IF LEN TS=2 THEN LET TS=" "+TS
1830 LET CS=GS+ES+NS+TS
1835 CLS
1838 PRINT AT 9,10;"PRECESSION",,,,,
1840 PRINT "EPOCH";TAB 10;"RA";TAB 25;"DEC"
1850 PRINT " ";IN;":";RS+"      "+DS
1860 PRINT " ";FI;":";AS+"      "+CS
1870 PRINT
1880 PRINT
1890 PRINT "WANT ANOTHER? Y/N"
1895 INPUT YS
1900 IF YS(1)  "Y" THEN PRINT "GOOD-BYE"
1901 IF YS(1)  "Y" THEN GOTO 1910
1902 IF YS(1)="Y" THEN PRINT "(S)AME OR (N)EW EPOCH? S/N"
1904 INPUT QS
1905 CLS
1906 IF QS="S" THEN GOTO 1230
1908 IF QS="N" THEN GOTO 1060
1910 STOP
```

ZX-81 PROGRAM

Submitted by Bob Howard (WA6DGI) adapted for The TS1000 from July 1984, Astronomy Magazine and printed on Brother EP-44. This program converts the RA & DEC coordinates from any Epoch to and year.

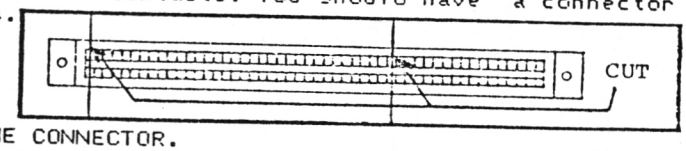
LIST GROUP

PARTS REQUIRED:
- 1- 35/70 contact edge connector, wire wrap pins
- 1- male, 64 contacts, finger connector
- 1- RCA phono plug
- 1- 5 wire cable to interface monitor, 3 - 4 feet

TOOLS REQUIRED:
- Fine blade saw (coping saw, hack saw or X-ACTO razor saw)
- Soldering iron with fine tip
- Needle nose pliers
- Small vise

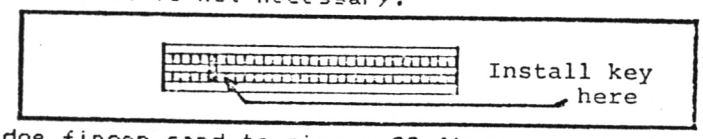
STEP-1 CUTTING THE EDGE CONNECTOR TO SIZE.
Place the 35/70 contact edge connector in a vise and lightly tighten. Using a fine blade saw, carefully cut through the connector at the first (1st) contact. Count the contacts from the cut end to the 33rd contacts and mark with a pencil. Carefully cut through the 33rd contacts. You should have a connector with two equal rows of 32 contacts.

Cutting edge connector



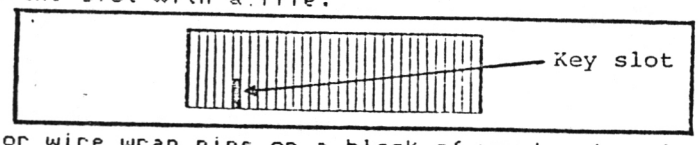
STEP-2 INSTALLING THE KEYWAY IN THE CONNECTOR.
Starting from one end of the connector, count up to the 6th set of contacts and mark with a pencil. If your connector came with a plastic "T" key, insert the key into the 6th contacts and push down until it is locked in place. If you do not have a "T" key the you will have to make one from a piece of 1/16" plastic or P/C material. Using a needle nose pliers, pull out both (top and bottom) contacts in the 6th slots of the connector. Cut a section of plastic to fit into the vacant slots. Insert the key into the connector. It should be a snug fit-DO NOT FORCE INTO THE CONNECTOR! Trim the key if necessary. A drop of super glue can be applied to the key, however it is not necessary.

Installing key



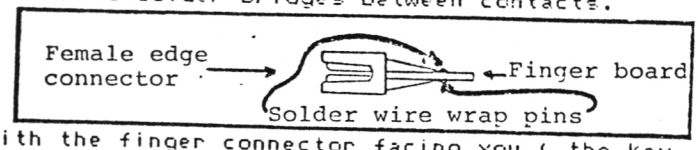
STEP-3 MALE FINGER CONNECTOR.
Cut a section of .1" spaced P/C edge finger card to size - 32 fingers each side and approximately 3/4"-7/8" wide. At any end, count up to finger 6 and mark. Place the finger board in a vise and make 2 cuts into the 6th finger with a saw . Break out the narrow section of material remaining between cuts with a needle nose pliers. Smooth both sides of the slot with a file.

Male finger assy



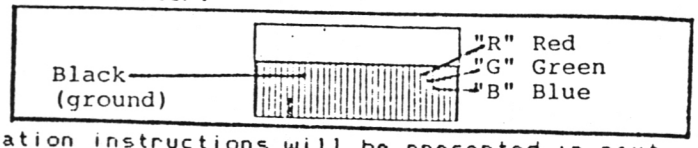
STEP-4 ASSEMBLY.
Place the 64 contact edge connector wire wrap pins on a block of wood and apply upwards pressure on the body of the connector. The pins should uniformly bend towards the center of the connector. Turn the connector over and repeat the previous step. Carefully position the finger connector between both rows of wire wrap pins of the edge connector. Be sure that both connectors are at right angles of each other. Solder each wire wrap pin to the appropriate land on the finger board. Make sure that there are no solder bridges between contacts.

Assembly



STEP-5 RGB CONNECTIONS.
Position the connector assembly with the finger connector facing you (the key slot facing the left-hand side). This is the bottom of the assembly. Count up from the left-hand side of the connector to the 7th wire wrap pin (2nd pin after the slot) and solder a length of BLACK wire to this pin. This is the GROUND lead. Count down from the right-hand side of the connector to the 6th wire wrap pin and solder a RED wire to this pin. This is "R". Solder a length of GREEN wire to the 5th wire wrap pin. This is "G". Solder a length of BLUE wire to the 4th wire wrap pin. This is "B". Solder a YELLOW wire to the center contact of an RCA phono plug. This will plug into the MONITOR jack on the 2068 to provide a SYNC signal for the RGB monitor. Slide a length of tubing over the 5 wires to form a cable. The free ends of the cable must be soldered to an appropriate connector to mate with the monitor.

Wire cable connections



The internal computer RGB modification instructions will be presented in next months L.I.S.T. -- see you then...Bob Gilder

9/84

NOTE: Bob Gilder's interface works beautifully and he found he didn't even need TIMEX's synch stripper, as the monitor (and most with NTSC input) has such circuits. If yours are disabled or inaccessible, you might need to build this little circuit. Again, we doubt it, but the circuit "couldn't hurt".

LONG ISLAND GROUP
Sinclair
TIMEX

Attachment of an RGB Monitor

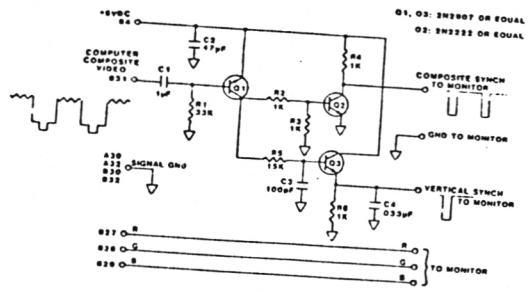
The TS 2068 provides via the P1 rear-edge connector the ability to attach an RGB monitor for excellent picture clarity and resolution. The TTL-level logic signals appear directly on the rear-edge connector of the TS 2068 -- the necessary synch signals can be derived from the simple synch stripper/separator circuit described here.

The Schematic of Figure 2.4.1-3 shows the required connections and electronics. Attachment is via the 64-pin keyed P1 connector. Shielding should not normally be required, but ferrite beads are recommended on each wire to minimize EMI, TVI, etc.

Circuit Operation - R1 and the base-emitter junction of Q1 operate as a DC restoration circuit with current flowing only when the composite video input signal from connector pin B31 is at the synch level. With the charge maintained on C1, Q1 conducts only during the synch pulse interval (not during the color burst time). During this conduction interval, the composite synch signal appears in inverted form on the collector of Q1. The Q2 stage simply re-inverts the signal, providing at its collector a composite synch signal for the connected monitor.

To provide a separated Vertical synch pulse, R5 and C3 filter the output of Q1 to partially eliminate the Horizontal synch pulses which are shorter than the Vertical synch pulses. The partially filtered inverted signal is re-inverted by Q3, then R6 and C4 complete the elimination of the Horizontal synch pulses so that a separate Vertical synch pulse is supplied for the attached monitor.

Signals R, G, and B from connector pins B27, B28, and B29 can be supplied directly to the attached monitor.

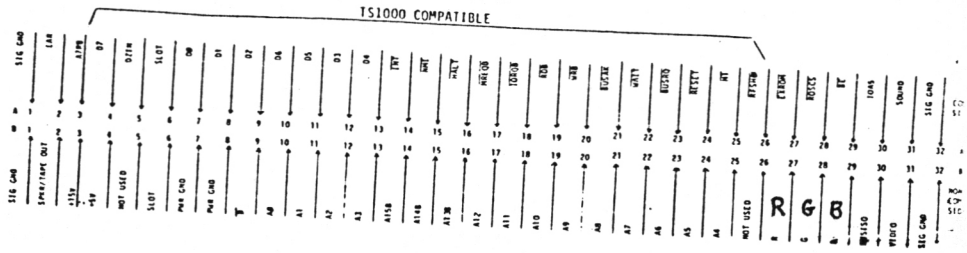


SCHEMATIC FOR RGB MONITOR CONNECTION

P1 CONNECTOR SIGNAL LAYOUT

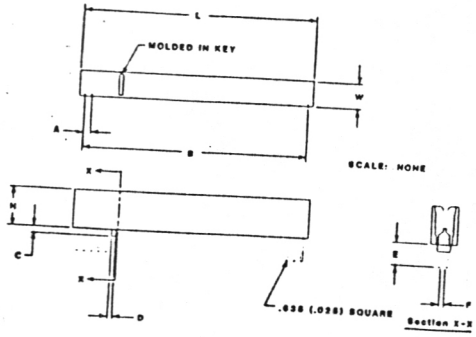
TS 2068 MANUAL EXTRACTS

COMPONENT SIDE



NON-COMPONENT SIDE

(VIEW FROM FRONT OF COMPUTER)



SPECIFICATIONS

LTR	DIMENSION *
L	83.88 (3.30)
W	9.936±0.127 (.375±.005)
H	13.97±0.394 (.550±.016)
A	2.54 (.100)
B	31 EQUAL SPACES AT 2.54 (.100)±.76 (±.030)
C	2.54 (.10)
D	1.727 (.068) MAX
E	8.382±0.508 (.330±.020)
F	FOR 1.575 (.062) BOARD

* All dimensions are in millimeters dimensions shown (XX.X) are in inches.

NOTES

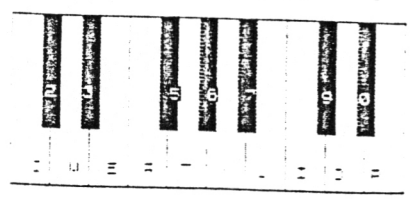
1. INSULATOR MATERIAL: Insulator body shall be 30% glass-filled polyester and shall meet UL94V-0 requirements.
2. CONTACT MATERIAL: Contact material shall be phosphor bronze.
3. CONTACT FINISH: Contacts shall be selectively plated with gold. 0.00038 (.0000152) thick over nickel on contact surface.
4. INSERTION FORCE: Insertion forces shall be 170.1-283.5 grams (8-10 oz) per contact pair using a 1.575 (.062) flat steel test blade.
5. WITHDRAWAL FORCE: Withdrawal forces shall be 226.8-340.2 grams (8-12 oz) per contact pair using a 1.575 (.062) flat test blade.
6. NORMAL FORCE: Normal force shall be 85.05 grams (3 oz) minimum when mated with a 1.37 (.054) thick test board.
7. PURCHASE FROM: San Diego Microtronics INC. San Diego CA 92123.

64 PIN CONNECTOR

PI MATING CONNECTOR MECHANICAL REQUIREMENTS

PIANO

For lower octave press A
For middle octave press S
For higher octave press D



LISTING

LIST
10 IDLE DAY DRIVE
CENTERPORT, N.Y. 11721

TO:

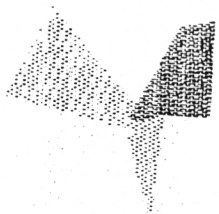
POT POURRI

VU-3D's SECRET SHAPES

Did you know that VU-3D (from Psion for the 2068) comes with two demo shapes. One is the goblet shown on the box, and which you LOAD after loading in VU-3D. The other, however, is built right into the program and can be manipulated right away, if you simply don't clear it when you first load VU-3D.

The shape is actually two shapes, a pair of pyramids jammed together near their apexes.

The accompanying screen dumps show these secret shapes. Can you figure out how to call them up without actually loading a new shape?

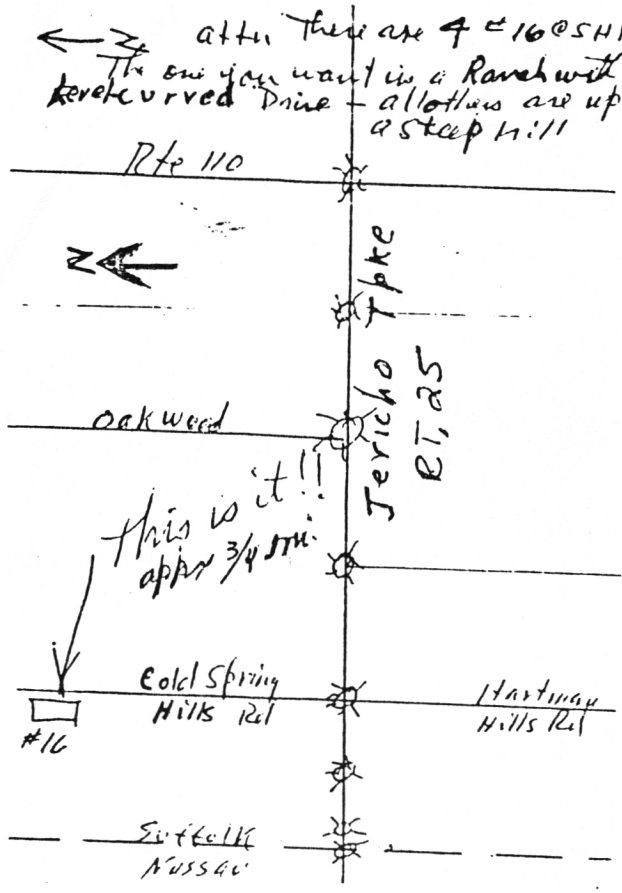


MAG=002.45 ROT 093 042 Z=+00290

MAG=002.45 ROT 093.042 Z=+00290

WARNING

When the second display file is active at the screen, any system messages such as SCROLL?, error reports, or use of the INPUT command will not be visible and the system may appear to be "hung". Indiscriminately pressing keys may be filling the "invisible" Edit Line with "garbage" thus further aggravating the situation. The ON ERR facility can be used to intercept some of these situations and set the video mode to use Display File 1 at the screen in order that the message can be seen and responded to. Otherwise, it is necessary to key in and execute from the Edit Line without being able to see it.



Meeting: Sept 30th, 2 P.M.

Quarterly Newsletter of the SOFTWARE LIBRARY

THAT ZERO LINE AGAIN

On reading the last issue of Computerchat, I became interested in the different methods used to create line 0's in listings. The easiest way to do this is to write a line 1 and then POKE 23756,0. However any line 0 can be removed by POKE 23756,1 or whatever.

I put my copyright message at the other end of the program. When a line 1 is written, POKE 23755,46: POKE 23756,224 will turn it into a line 2000 (in effect a line 12000). This type of line will list after 9999 and is also edit-proof as it cannot be re-entered. For POKE 23755,n, n can take any value between 40 and 63.

It is simple to write a program and then merge a short two-line BASIC program containing the copyright messages with it. However when a program of 7K or more, containing a line greater than 9999, is merged into the machine the result is a crash as the machine tries to compose a line greater than 9999 with the contents of memory. This means the auto-run cannot be avoided. If POKE 23613, PEEK 23730-5 is used to disengage the BREAK key, then the BASIC program produced can be as hard to copy as a machine code program.

The line number POKEs depend on BASIC program area starting at 23755 which is not true on a Spectrum with microdrives.

P.S. Did you know that on the Spectrum a basic line can be entered that does not contain a key word? A basic line can be entered that contains only a cursor colour command, 1-0 in extended mode....is this another bug in the ROM?

P.P.S. Try this:

```
10 PLOT 128,0
20 DRAW 0, 175, 189xPI
```

D. Spencer
Leek, Staffs

As of: 8/27/84

LIST GROUP

	NAME	ADDRESS	PHONE
1	P.J. Donnelly	10 Idle Day Drive Centerport, N.Y. 11721	W 212-572-7603 H 516-261-6934
2	Heinz Hanken	9 Dartmoor Drive East Northport, N.Y. 11731	368-9088 737-3557 (W)
3	N. Pashtoon	37 Laurel Drive Port Jefferson, N.Y. 11777	331-1658
4	Bob Malloy	412 Pacific Street Massapequa Park, N.Y. 11762	516-541-6731
5	Jeff Street	62 Harriet Lane Huntington, N.Y. 11743	423-9003
6	Al Greenfeld	14 Wisteria Way Commack, N.Y. 11725	499-3178
7	Rich Becker	18 Mangin Rd COMMACK, N.Y.	499-2413
8	Jerry Haack	23 Reese Place Farmingdale, N.Y. 11735	
9	Lando Landucci	13th Floor 800 3rd Avenue New York City 10022	572-7819
10	Kevin Smith	21 Whittier Drive Greenlawn, N.Y. 11740	754-2398 (H) 435-7309
11	A. Charles Davidson	2639 Imperial Street Salt Lake City, Ut. 84106	
12	Robert L. Howard (WA6DC)	750 N. Yaleton Avenue West Covina, Ca. 91790	818-338-3291
13	John R. Scott (A. Blinkin')	619 MacArthur Drive Colma, Ca 94015	415-755-3907
14	Robert Gilder	69 Jefferson Place Massapequa, New York 11758	541-2271
15	Morton Jeskin	16 Cold Spring Hills Road Huntington, N.Y. 11743	692-7168
16.	John McCullough	LaBonne Vie Dr 40B East Patchogue, N.Y. 11746	
17.	Harvey Rait	5 Peri Lane Valley Stream, N.Y. 11581	791 6247
18.	Chuck Russell	2 Elsmere Place East Northport, N.Y. 11731	499-9138
19	Hank Brech	106 Princeton Street Williston Park, N.Y. 11596	
20.	Fred Kaplan	33-65 14th Street Long Island City, N.Y. 11106	

ARTICLE

SAVING 2068 PROGRAMS REVISITED

by Dennis Jurries

MC - machine code program name
Basic - basic program name
Screen - screen string program name

1. LOAD the proagram until the screen display is displayed then BREAK and LIST. This listing will give you the starting address of the machine code (found in the line RAND USR #), the name of the MC, and SCREEN$ programs.

2. LOAD the MC program (LOAD "MC" CODE)

3. PEEK the MC program looking for the length. This can be done by looking in the MC until you find a long group of 0's (say 32).

4. SAVE "Basic"LINE 1
   SAVE "Screen"SCREEN$
   SAVE "MC"CODE #1,#2
   #1 is the starting address from RAND USR. #2 is the length of the MC routine determined by subtracting the starting address from the ending address found when you peeked the MC and found the start of the 0's or by using the top of memory 65535 (IE. say start address from RAND USR 42000: 65535-42000 = 23535 then SAVE "MC"CODE 42000, 23535).

Try this short program making sure that you reload the basic loader program should you over write part of it. This will help you find the end of the machine code program.

```
1 LET k=starting address of MC
2 IF PEEK k=0 THEN PRINT k
3 LET k=k+1
4 GOTO 2
```

CAUTION: DO NOT TRY TO VERIFY THE SCREEN DISPLAY, IT WILL NOT VERIFY.

((((((((((((((((((

##################

GETTING THE IN ON THE 2068

by Dennis Jurries

The are a possible of 65536 I/O ports on the 2068. These are used by the computer for communicating with things like the keyboard or the printer, and the can be controlled from BASIC by using the IN statement.

IN is a function like PEEK
IN address

The keyboard is divided up into 8 half rows of 5 keys each.

```
IN 65278 reads CAPS SHIFT to V
IN 65022 reads A to G
IN 64510 reads Q to T
IN 63486 reads 1 to 5
IN 61438 reads 0 to 6
IN 57342 reads P to 7
IN 49150 reads ENTER to H
IN 32766 reads SPACE to B
```

The value of these addresses when no key is depressed is 31. Starting from the outside of the keyboard and moving towards the center the values are 30,29,27, 23, & 15. On some models of the Spectrum; no key depressed is 255, and the other values are 254,253,251,247, & 239.

The following program illustrates this.

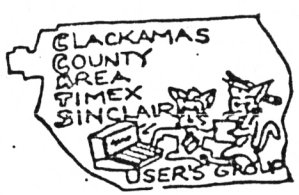
```
10 FOR n=0 TO 7 REM half-row #
20 LET a=254+256*(255-2^n)
30 PRINT AT 0,0,IN a:GOTO 30
```

When you finish with each half row, press BREAK and then type NEXT n.

The IN function can be used in many ways in a program. One way is to use it to change a position of something on the screen. Say the variable X has some value; LET x=x-(IN65022=30) . This will decrease the value of X by 30 only if the A key is depressed.

****

EXTRACTED FROM:



TO:

LIST
10 IDLE DAY DRIVE
CENTERPORT, N.Y. 11721

LISTING